Date: Tue, 16 Nov 93 04:30:21 PST
From: Ham-Homebrew Mailing List and Newsgroup <ham-homebrew@ucsd.edu>
Errors-To: Ham-Homebrew-Errors@UCSD.Edu
Reply-To: Ham-Homebrew@UCSD.Edu
Precedence: Bulk
Subject: Ham-Homebrew Digest V93 #104
To: Ham-Homebrew

Ham-Homebrew Digest Tue, 16 Nov 93 Volume 93 : Issue 104

Today's Topics:

Send Replies or notes for publication to: <Ham-Homebrew@UCSD.Edu>
Send subscription requests to: <Ham-Homebrew-REQUEST@UCSD.Edu>
Problems you can't solve otherwise to brian@ucsd.edu.

Archives of past issues of the Ham-Homebrew Digest are available
(by FTP only) from UCSD.Edu in directory "mailarchives/ham-homebrew".

We trust that readers are intelligent enough to realize that all text
herein consists of personal comments and does not represent the official
policies or positions of any party. Your mileage may vary. So there.

Date: Mon, 15 Nov 1993 12:00:25 GMT
From: nevada.edu!news.unomaha.edu!news@uunet.uu.net
Subject: Guide to the Personal Radio Newsgroups
To: ham-homebrew@ucsd.edu

Posted-By: auto-faq 2.4
Archive-name: radio/personal-intro
Revision: 1.5 09/18/93 16:49:31
Changes: new mailing lists, .packet rmgroup, and .policy updates

(Note: The following is reprinted with the permission of the author.)

This message describes the rec.radio.amateur.*, rec.radio.cb, rec.radio.info,
and rec.radio.swap newsgroups. It is intended to serve as a guide for the new
reader on what to find where. Questions and comments may be directed to the
author, Jay Maynard, K5ZC, by Internet electronic mail at
jmaynard@oac.hsc.uth.tmc.edu. This message was last changed on 18 September
1993 to add the mailing lists for the new rec.radio.amateur newsgroups, to
note the rmgroup of rec.radio.amateur.packet, and to officially retire some

(in)famous threads of discussion on rec.radio.amateur.policy.

History

Way back when, before there was a Usenet, the Internet hosted a mailing list for hams, called (appropriately enough) INFO-HAMS. Ham radio discussions were held on the mailing list, and sent to the mailboxes of those who had signed up for it. When the Usenet software was created, and net news as we now know it was developed, a newsgroup was created for hams: net.ham-radio. The mailing list and the newsgroup were gatewayed together, eventually.

As the net grew, and as packet radio came into vogue, packet discussion began to dominate other topics in the group and on the list. This resulted in the logical solution: a group was created to hold the packet discussion, and another corresponding mailing list was created as well: net.ham-radio.packet and PACKET-RADIO, respectively.

These two groups served for several years, and went through Usenet's Great Renaming essentially unchanged, moving from net.ham-radio[.packet] to rec.ham-radio[.packet]. Readership and volume grew with the rest of the network.

The INFO-HAMS mailing list was originally run from a US Army computer at White Sands Missile Range, SIMTEL20. There were few problems with this arrangement, but one was that the system was not supposed to be used for commercial purposes. Since one of hams' favorite pastimes is swapping gear, it was natural for hams to post messages about equipment for sale to INFO-HAMS/rec.ham-radio. This ran afoul of SIMTEL20's no-commercial-use restriction, and after some argument, a group was created specifically for messages like that: rec.ham-radio.swap. This group wasn't gatewayed to a mailing list, thus avoiding problems.

While all this was happening, other folks wanted to discuss other aspects of the world of radio than the personal communications services. Those folks created the rec.radio.shortwave and rec.radio.noncomm newsgroups, and established the precedent of the rec.radio.* hierarchy, which in turn reflected Usenet's overall trend toward a hierarchical name structure.

The debate between proponents of a no-code ham radio license and its opponents grew fierce and voluminous in late 1989 and 1990. Eventually, both sides grew weary of the debate, and those who had not been involved even more so. A proposal for a newsgroup dedicated to licensing issues failed. A later proposal was made for a group that would cover the many recurring legal issues discussions. During discussion of the latter proposal, it became clear that it would be desirable to fit the ham radio groups under the rec.radio.* hierarchy. A full-blown reorganization was passed by Usenet voters in January 1991, leading to the overall structure we now use.

After the reorganization, more and more regular information postings began to appear, and were spread out across the various groups in rec.radio.*. Taking the successful example of the news.answers group, where informational postings from across the net are sent, the group rec.radio.info was created in December, 1992, with Mark Salyzyn, VE6MGS, initially serving as moderator.

In January, 1993, many users started complaining about the volume in rec.radio.amateur.misc. This led to a discussion about a second reorganization, which sparked the creation of a mailing list by Ian Kluft, KD6EUI. This list, which was eventually joined by many of the most prolific posters to the ham radio groups, came up with a proposal to add 11 groups to the rec.radio.amateur hierarchy in April 1993. The subsequent vote, held in May and early June, approved the creation of five groups: rec.radio.amateur.digital.misc (to replace .packet), .equipment, .homebrew, .antenna, and .space.

The Current Groups

I can hear you asking, "OK, so this is all neat history, but what does it have to do with me now?" The answer is that the history of each group has a direct bearing on what the group is used for, and what's considered appropriate where.

The easy one is rec.radio.amateur.misc. It is what rec.ham-radio was renamed to during the reorganization. Any message that's not more appropriate in one of the other groups belongs here, from contesting to DX to ragchewing on VHF to information on becoming a ham.

The group rec.radio.amateur.digital.misc is for discussions related to (surprise!) digital amateur radio. This doesn't have to be the common two-meter AX.25 variety of packet radio, either; some of the most knowledgeable folks in radio digital communications can be found here, and anything in the general area is welcome. The name was changed to emphasize this, and to encourage discussion not only of other text-based digital modes, such as AMTOR, RTTY, and Clover, but things like digital voice and video as well. The former group, rec.radio.amateur.packet, should be removed by September 21st, 1993. It is obsolete, and you should use .digital.misc instead (or the appropriate new mailing list, mentioned below). The group has .misc as part of the name to allow further specialization if the users wish it, such as .digital.tcp-ip.

The swap group is now rec.radio.swap. This recognizes a fact that became evident shortly after the original group was formed: Hams don't just swap ham radio gear, and other folks besides hams swap ham equipment. If you have radio equipment, or test gear, or computer stuff that hams would be interested in, here's the place. Equipment wanted postings belong here too. Discussions about

the equipment generally don't; if you wish to discuss a particular posting with the buyer, email is a much better way to do it, and the other groups, especially .equipment and .homebrew, are the place for public discussions. There is now a regular posting with information on how to go about buying and selling items in rec.radio.swap; please refer to it before you post there.

The first reorganization added two groups to the list, one of which is rec.radio.amateur.policy. This group was created as a place for all the discussions that seem to drag on interminably about the many rules, regulations, legalities, and policies that surround amateur radio, both existing and proposed. Recent changes to the Amateur Radio Rules (FCC Part 97) have finally laid to rest the Great Usenet Pizza Autopatch Debate as well as complaints about now-preempted local scanner laws hostile to amateurs, but plenty of discussion about what a bunch of rotten no-goodniks the local frequency coordinating body is, as well as the neverending no-code debate, may still be found here.

The other added group is rec.radio.cb. This is the place for all discussion about the Citizens' Band radio service. Such discussions have been very inflammatory in rec.ham-radio in the past; please do not cross-post to both rec.radio.cb and rec.radio.amateur.* unless the topic is genuinely of interest to both hams and CBers - and very few topics are.

The rec.radio.info group is just what its name implies: it's the place where informational messages from across rec.radio.* may be found, regardless of where else they're posted. As of this writing, information posted to the group includes Cary Oler's daily solar progagation bulletins, ARRL bulletins, the Frequently Asked Questions files for the various groups, and radio modification instructions. This group is moderated, so you cannot post to it directly; if you try, even if your message is crossposted to one of the other groups, your message will be mailed to the moderator, who is currently Mark Salyzyn, VE6MGS. The email address for submissions to the group is rec-radio-info@ve6mgs.ampr.ab.ca. Inquires and other administrivia should be directed to rec-radio-request@ve6mgs.ampr.ab.ca. For more information about rec.radio.info, consult the introduction and posting guidelines that are regularly posted to that newsgroup.

The groups rec.radio.amateur.antenna, .equipment, .homebrew, and .space are for more specialized areas of ham radio: discussions about antennas, commercially-made equipment, homebrewing, and amateur radio space operations. The .equipment group is not the place for buying or selling equipment; that's what rec.radio.swap is for. Similarly, the .space group is specifically about amateur radio in space, such as the OSCAR program and SAREX, the Shuttle Amateur Radio EXperiment; other groups cover other aspects of satellites and space. Homebrewing isn't about making your own alcoholic beverages at home (that's rec.crafts.brewing), but rather construction of radio and electronic equipment by the amateur experimenter.

Except for rec.radio.swap and rec.radio.cb, all of these newsgroups are available by Internet electronic mail in digest format; send a mail message containing "help" on a line by itself to listserv@ucsd.edu for instructions on how to use the mail server.

All of the groups can be posted to by electronic mail, though, by using a gateway at the University of Texas at Austin. To post a message this way, change the name of the group you wish to post to by replacing all of the '.'s with '-'s - for example, rec.radio.swap becomes rec-radio-swap - and send to that name@cs.utexas.edu (rec-radio-swap@cs.utexas.edu, for example). You may crosspost by including multiple addresses as Cc: entries (but see below). This gateway's continued availability is at the pleasure of the admins at UT-Austin, and is subject to going away at any time - and especially if forgeries and other net.abuses become a problem. You have been warned.

A Few Words on Crossposting
===========================

Please do not crosspost messages to two or more groups unless there is genuine interest in both groups in the topic being discussed, and when you do, please include a header line of the form "Followup-To: group.name" in your article's headers (before the first blank line). This will cause followups to your article to go to the group listed in the Followup-To: line. If you wish to have replies to go to you by email, rather than be posted, use the word "poster" instead of the name of a group. Such a line appears in the headers of this article.

One of the few examples of productive cross-posting is with the rec.radio.info newsgroup. To provide a filtered presentation of information articles, while still maintaining visibility in their home newsgroups, the moderator strongly encourages cross-posting. All information articles should be submitted to the rec.radio.info moderator so that he may simultaneously cross-post your information to the appropriate newsgroups. Most newsreaders will only present the article once, and network bandwidth is conserved since only one article is propagated. If you make regular informational postings, and have made arrangements with the moderator to post directly to the group, please cross-post as appropriate.

--
Jay Maynard, EMT-P, K5ZC, PP-ASEL | Never ascribe to malice that which can
jmaynard@oac.hsc.uth.tmc.edu | adequately be explained by stupidity.
      "If my car ran OS/2, it'd be there by now" -- bumper sticker
                  GCS d++ p+ c++ l+ m+/- s/++ g++ w++ t+ r

--
73, Paul W. Schleck, KD3FU

pschleck@unomaha.edu

Date: Sun, 14 Nov 1993 18:03:10 GMT
From: mvb.saic.com!unogate!news.service.uci.edu!usc!wupost!darwin.sura.net!fconvx.ncifcrf.gov!fcs260c!mack@network.ucsd.edu
Subject: Power amplifier at 2.4gHz
To: ham-homebrew@ucsd.edu

In article <2606@arrl.org> zlau@arrl.org (Zack Lau) writes:
>In rec.radio.amateur.homebrew, faunt@netcom3.Netcom.COM
>   (Doug Faunt N6TQS 510-655-8604) writes:
>>Can someone give me pointers to amplifiers for 2.4gHz?
>>We're trying to build an ATV repeater here with a 13cm output, and we
>>need a linear power amp.
>
>Devices to build homebrew amps can be a problem on this
>band--I've been looking since 1988.
>
>The AT8140/ATF44101 now sold by HP is good for at least a
>watt of linear power (2 watts well into gain compression),
>but last I heard they cost $80 new. You can get 13 or 14 dB
>of gain at 2.3 GHz, though.
>
>Thompson has some pricey devices ($250+) that are designed
>for class C but can probably be forced with a great deal
>of effort to be somewhat linear. One way of getting 10
>to 20 watts (up to 80 by combining 4 devices). Gain is
>usually around 9 or 10 dB. I suspect the usual way hams
>get them is as prizes at VHF/microwave conferences.
>
>Water cooled 2C39s supposedly work fine, but may be too much
>bother.
>
>I've had some success retuning surplus 6 GHz FETs to work
>at 2 GHZ--but each FET seems to a little different. I've
>seen 10 to 13 dB of gain and 2 to 3.5 watts out of a 3 watt
>device. This might be your best bet--find some surplus
>transistors/microwave amps and retune them. From what I've
>heard, impedance matched FETs use low pass networks. This
>seems right--it was quite obvious that the 6 GHz FET I tried
>did not want to work on 10 GHz (-15 dB gain).
>
>For real power, people have modulated microwave ovens for ATV.
>
>The VA 802 Klystron has also been used by amateurs for EME

>work (usually run at a conservative 300 to 400 watts) but
>these are tough to find.
>
>Zack Lau KH6CP/1
>
>Internet: zlau@arrl.org   "Working" on 24 GHz SSB/CW gear
>   Operating Interests: 10 GHz CW/SSB/FM
>US Mail: c/o ARRL Lab   80/40/20 CW
> 225 Main Street   Station capability: QRP, 1.8 MHz to 10 GHz
> Newington CT 06111   modes: CW/SSB/FM/packet
>   amtor/baudot
>Phone (if you really have to): 203-666-1541

How about a travelling wave tube? Theere's a guy in Ellicot City, MD,
Jeff Kreuth who services these things and has used ones for sale at reasonable
($200) prices. I'll find his ph# if you like.
Joe Mack NA3T
mack@ncifcrf.gov

Date: Mon, 15 Nov 1993 20:39:16 GMT
From: usc!cs.utexas.edu!swrinde!gatech!usenet.ins.cwru.edu!magnus.acs.ohio-
state.edu!csn!teal.csn.org!dfeldman@network.ucsd.edu
Subject: Power amplifier at 2.4gHz
To: ham-homebrew@ucsd.edu

>
>How about a travelling wave tube? Theere's a guy in Ellicot City, MD,
>Jeff Kreuth who services these things and has used ones for sale at reasonable
>($200) prices. I'll find his ph# if you like.
>Joe Mack NA3T
>mack@ncifcrf.gov
>

Who?

Date: 15 Nov 93 19:15:32 GMT
From: yuma!galen@purdue.edu
Subject: RS FREQ COUNTER HOLD MOD!!!!!!!!
To: ham-homebrew@ucsd.edu

How to add a hold function to the Radio Shack RF Frequency Counter:

Ground TP 17. In the schematic, TP17 is pin one of U3, connected to
+5V thru a 47k resistor. On the circuit board, TP17 is on the display

side, just right of the lower-right corner of the IC. Grounds are about
1/4 inch below and to the right, the three non-tinned points in the large
area of metal. TP17 is the tinned pad next to a SM resistor marked '473'
for 47k.

I rigged a momentary switch to ground TP17 thru a 1k resistor (you never
can tell) and it works just fine! I drilled a small hole to mount the switch
just above the plastic depression so I could push the button with my right
thumb. A small toggle switch would fit.

I'll be trying the other TP's to see what wonderful things RS didn't put
on the front.

Galen, KF0YJ

Date: Mon, 15 Nov 1993 04:06:02 GMT
From: munnari.oz.au!bruce.cs.monash.edu.au!trlluna!titan!pcies4.trl.OZ.AU!
drew@uunet.uu.net
Subject: Xtal filter help.
To: ham-homebrew@ucsd.edu

In article <CGF4r4.F00@seastar.org> jjw@seastar.org (John Welch) writes:
>From: jjw@seastar.org (John Welch)
>Subject: Xtal filter help.
>Date: Sat, 13 Nov 1993 06:59:24 GMT
>
> I've been working on a home-built xtal filter, and have got it
>working. However, I'm trying to figure out how to match its input &
>output to the other stages.
>
> I have made a simple bridge circuit, and it appears that the
>resonant impedance is about 150 ohms. Is this the impedance I need to
>match to? If not, how do I find the right impedance? I have a decent
>(60MHz) scope, DMM and a comm analyzer as well as a DDS frequency
>source and a counter. Is this adequate equipment to build filters, or
>is there something else I need?
>
> Thanks much for all help... -->jjw@seastar.org
>
>--
>John Welch, N9JZW

Hi John. Here are three recent articles which (IMHO) are really good. Try
to look up:-

(1) "Designing and Building Simple Crystal Filters"

 by Wes Hayward, W7ZOI, QST July '87.

(2) "Switchable Bandwidth Crystal Filter"
 by John Pivnichny, N2DCH, Ham Radio Feb. '90 and

(3) "Twin Crystal Ladder Filters"
 by John Pivnichny, 73 Amateur Radio Today, Jan. '93.

Date: 15 Nov 93 20:24:11 GMT
From: ogicse!hp-cv!sdd.hp.com!hpscit.sc.hp.com!rkarlqu@network.ucsd.edu
To: ham-homebrew@ucsd.edu

References <1993Nov13.164257.15906@cs.rit.edu>, <2c4lhr$6pi@hpscit.sc.hp.com>,
<1993Nov15.164550.18931@cs.rit.edu>
Subject : Re: single sideband

In article <1993Nov15.164550.18931@cs.rit.edu>,
Albert T Davis <atd@cs.rit.edu> wrote:
>
>This is why they abandoned the phasing method back in the days of tubes.
>It was all true then. It was difficult to get even 20 db or so of
>carrier and alt sideband suppression. Even discrete transistor circuits
>are probably not good enough here. How much carrier suppression is
>required? It seems to me that today's IC's should be able to do it.

Regarding IC's as balanced modulators: "today's" IC's (i.e. MPY600)
are not necessarily any better than 1970's IC's (i.e. MC1496) in terms
of balance. They just run at higher frequencies. Probably the best
that can be hoped for is internally trimmed IC's. This is better than
a 1496 w/o external trimming, but not as good as an externally tweaked
1496. The other problem with Gilbert cell IC's is that to get good
IMD, you have to operate them at very low levels. This exascerbates
the carrier suppression problem because the signal is small compared
to the carrier. Since Gilbert cells have high noise levels, dynamic
range is a big problem.

>If not, generate it at a low IF and use a simple notch.

Because even for a 20 kHz. IF, "a simple notch" is quite difficult to
implement. That's a whole separate discussion.

>
>> .... On the other hand, with active
>>audio phase shift networks and divide by 4 RF drive, you can actually
>>get pretty decent unwanted sideband suppression, except for amplitude
>>balance, which is still a crapshoot. ....

>
>Why is amplitude balance a crapshoot? With op-amp circuits it should be
>easy, for the audio. You might have a valid argument on the RF side.
>Can you explain?

Like you said, you can make the audio network about as good as you
want fairly easily by using .1% resistors and 1% capacitors along
with 50 MHz. opamps in a state variable configuration. That would
probably be good for 60 dB. opposite sideband rejection (if it were
the only factor). You can get the LO phase difference as close
as you want to 90 degrees by using a sufficiently fast flip flop.
You can get the RF in-phase splitter just about perfect by using 1%
51 ohm resistors. The crapshoot part is that you don't have perfectly
matched mixers, either in amplitude or phase. I suppose you could
put in sockets and try a bunch of them. Remember that as a rule of
thumb, all errors must be less than 1% to get 40 dB. rejection.

>
>> ..... Also, ham rigs could get by with
>>more distortion and splatter that the FCC normally allows. For example,
>>may popular ham linears won't meet FCC commercial regs that say 11th
>>order intermod has to be down 60 dB. or thereabouts. (It's been 15
>>years since I designed HP marine radios so don't hold me to the
>>exact number).
>
>Isn't the problem mostly in the linear amp? If this is the case I don't
>see how the method of generating SSB should change that. 15 years ago,
>the technology was not good enough. I agree.

Well, now that you mention it, the 11th order stuff was mainly
crossover distortion in the power amp. However, the MC1496 mixers
gave us a lot of trouble with 3rd order IMD, which is also spec'ed, but
not at 60 dB. Most ham linears don't meet commercial 3rd order IMD.

>
>Actually, I was thinking of using the phasing method for receive too,
>thereby eliminating the need for the expensive crystal filter. Convert
>early. Use a simple LC filter, similar to that used in the first IF
>of a dual conversion receiver, then do most of the amplification and
>filtering at audio. It is probably necessary to amplify the I and Q
>channels separately because the phase shift is likely to be noisy.
>It is easier to design a good audio amplifier than a good RF amplifier.

Of course the problem with this method is you will be limited to
40 dB. or so selectivity for the opposite sideband (which is really
the adjacent "channel" so to speak.) That is pretty lousy receiver
performance.

>
>I have designed and build audio filters with slopes that put any RF
>filters I have ever seen to shame. Doing the filtering at audio
>makes it easy to have truly variable bandwidth, notch filters (pre
>and post mixing) and other signal processing. It seems to me that
>this benefit would be too great to pass up.

OK, now I see where you're coming from!

What you really want to do is: instead of the phasing method of SSB,
use the Weaver method of SSB (also called the "third" method, or the
zero IF method). In this method, you build a direct conversion
receiver with the IF centered at zero Hz. (DC). A conventional
direct conversion receiver has the "carrier" frequency at DC but the
IF is centered at 1.5 kHz. (for a 3 kHz. BW). As with the phasing
method, you use dual mixers in quadrature. You then need an additional
pair of mixers driven at 1.5 kHz. to combine the audio from the I and
Q IF's. Now what happens is that the audio selectivity equals the
RF selectivity so there is no limit to the skirt selectivity you
can get. Imperfections in the mixer balance, phase and amplitude
errors do not cause reception of out of band signals. Instead,
they result in aliasing of high frequencies to low frequencies
and vice versa. But that just causes a little audio distortion
(40 dB. = 1 %). LO leak thru results in a 1.5 kHz. tone in the
audio. That *is* fairly easy to notch out. Go ahead, build this
system and write it up for Communications Quarterly. I'll be
interested to see how well you can do.

Rick Karlquist N6RK
rkarlqu@scd.hp.com

Date: (null)
From: (null)
However, significantly steeper slopes and greater stop-band attenuation than
shown in (say) (1) may be had by building the filter in a compartmented box
type construction, using circuit board or brass sheet so that no crystal
can "see" another crystal, and the input is well separated from the output.

73, Drew, VK3XU.

End of Ham-Homebrew Digest V93 #104
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****